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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
| 10/727,220 | 12/02/2003 | John C. Schultz | 59333US002 | 5391 |
| 32692 7590 03/14/2007 3M INNOVATIVE PROPERTIES COMPANY PO BOX 33427 ST. PAUL, MN 55133-3427 | | | EXAMINER HUYNH, ANDY | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2818 | |
| SHORTENED STATUTORY PERIOD OF RESPONSE | | NOTIFICATION DATE | DELIVERY MODE | |
| 3 MONTHS | | 03/14/2007 | ELECTRONIC | |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 03/14/2007.

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Office Action Summary

Application No.

10/727,220

Applicant(s)

SCHULTZ ET AL.

Examiner

Andy Huynh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 September 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27,29-33,35-37 and 39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27,29-33,35-37 and 39 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 09/25/2006.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

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DETAILED ACTION

This is responsive to Amendment and the decision on the petition filed on September 25, 2006, which are treated as a petition to withdraw the holding of abandonment in the current application. The petition is **GRANTED**. Therefore, the Notice of Abandonment was mailed on August 23, 2006 is withdrawn.

By this amendment, claims **28, 34 and 38** have been canceled. Claims **35 and 39** have been amended.

Response to Arguments

Applicant's arguments, filed on 09/25/2006, with respect to claims **1-27, 29-33, 35-37, and 39** have been considered but are moot in view of the new ground(s) of rejection.

Information Disclosure Statement

This office acknowledges receipt of the following items from the applicant: Information Disclosure Statement (IDS) filed 09/25/2006 and 04/17/2006. The references cited on the PTOL 1449 form have been considered.

Claim Objections

Claim 39 is objected to because of the following reasons.

It is believed that claim 39 should depend from claim 35 instead of claim 38, which has been canceled.

Claim Rejections - 35 U.S.C. § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3-11, 16, 18-24, 26, 27, 29, 30 and 33 are also rejected under 35 U.S.C. 102(e) as being anticipated by Sugimoto et al. (US 6,874,910 hereinafter as "Sugimoto").

Regarding claims 1 and 8, Sugimoto discloses in Figs. 1, 16, 18 and the corresponding texts as set forth in column 10, line 45-column 12, line 34, column 22, line 60-column 25, line 6, an illumination assembly/a light source apparatus 1 comprises:

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a substrate comprising an electrically insulative layer/an insulating member 4 on a first side of the substrate and an electrically conductive layer/a radiator plate 3 made of thermally conductive material on a second side of the substrate;

a plurality of LED dies/chips 2, each LED die/ chip disposed in a via/a through hole 6 extending through the electrically insulative layer/the insulating member on the first side of the substrate to the electrically conductive layer/the radiator plate on the second side of the substrate, wherein each LED die/chip is electrically and thermally connected through the via/the through hole to the electrically conductive layer/the radiator plate on the second side of the substrate (Figs. 16 and 18, col. 23, lines 37-50, col. 24, lines 55-67).

Regarding claim 3, Sugimoto discloses the electrically insulative layer/the insulating member made of polymer on the first side of the substrate.

Regarding claim 4-6, Sugimoto discloses all the claimed limitations except for the via extending through the electrically insulative material is chemically etched, plasma etched, or laser milled. However, the limitations “the via extending through the electrically insulative material is chemically etched, plasma etched, or laser milled” is taken to be a product by process limitation and consider non-limitation. In a product-by-process claim, it is the patentability of the claimed product and not of the recited process steps which must be established. Therefore, when the prior art discloses a product which reasonably appears to be identical with or only slightly different than the product claimed in a product-by process claim, a rejection based on sections 102 or 103 is fair. The Patent Office is not equipped to manufacture products by a myriad of processes put before it and then obtain prior art product and make physical comparisons therewith. In re Brown, 173 USPQ 685 (CCPA 1972). Also, a product by process claim directed

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to the product per se, no matter how actually made, In re Hirao, 190 USPQ I S at 17 (footnote 3). See In re Fessman, 180 USPQ 324, 326 (CCPA 1974); In re Marosi et al., 218 USPQ 289, 292 (Fed. Cir. 1983); and particularly In re Thorpe, 227 USPQ 964, 966 (Fed. Cir. 1985), all of which make it clear that it is the patentability of the final structure of the product "gleaned" from the process steps, which must be determined in a "product by process" claim, and not the patentability of the process. See also MPEP 2113. Moreover, an old and obvious product produced by a new method is not a patentable product, whether claimed in "product by process" claims or not.

Regarding claim 7, Sugimoto discloses the electrically conductive layer/the radiator plate on the second side of the substrate comprises a material selected from the group comprising copper, nickel, gold, aluminum, tin, lead, or a combination thereof (col. 10, line 55).

Regarding claims 9, 19 and 27, Sugimoto discloses in Fig. 10 the electrically conductive layer/the radiator plate is patterned to define a plurality of electrically isolated heat spreading elements 3a, 3b, each LED die electrically and thermally coupled to an associated heat spreading element.

Regarding claims 10-11, 16 and 33, Sugimoto discloses the illumination assembly further comprises a heat dissipation assembly disposed adjacent the second side of the substrate wherein the heat dissipation assembly is separated from the second side of the substrate by a layer of material that is thermally conductive (Fig. 18, col. 24, line 64-col. 25, line 4).

Regarding claims 18 and 20-22, Sugimoto discloses in Figs. 1, 16 and 18 and the corresponding texts as set forth in column 10, line 45-column 12, line 34, column 22, line 60-column 25, line 6, an illumination apparatus/a light source apparatus 1 comprises:

a substrate having an electrically insulative layer/an electrically insulating member 4 on a first surface and an electrically conductive layer/a radiator plate 3 made of thermally conductive material on a second surface, a plurality of mounting vias/through holes 6 extending through the electrically insulating layer to the electrically conductive layer/the radiator plate;

a plurality of light emitting elements/LED chips 2 disposed in the plurality of mounting vias/through holes, wherein the light emitting elements are electrically and thermally connected to the electrically conductive layer through the mounting vias/through holes (Figs. 16 and 18, col. 23, lines 37-50, col. 24, lines 55-67).

Regarding Claims **23, 29 and 30**, Sugimoto discloses in Fig. 16 the illumination apparatus of further comprising a plurality of wirebond vias 4e extending through the electrically insulating layer 4 to the electrically conductive layer, each wirebond via exposing a corresponding wirebond connection pad of the electrically conductive layer.

Regarding claim **24**, Sugimoto discloses in Fig. 1 the illumination apparatus/the light source apparatus further comprises a thermally conductive encapsulant/a sealing rein 10 contacting the light emitting elements and electrically insulating layer.

Regarding claims **26**, Sugimoto discloses in Figs. 1, 10, 16, 18 and the corresponding texts as set forth in column 10, line 45-column 12, line 34, column 22, line 60-column 25, line 6, an illumination assembly/a light source apparatus 1 comprises:

a layer of an electrically insulative layer/an insulating member 4;

a layer of thermally and electrically conductive material/a radiator plate 3 disposed on a bottom surface of the layer of insulative material, the conductive material/the radiator plate patterned to form a plurality of adjacent heat spreading elements 3a, 3b (Fig. 10);

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a plurality of vias/through holes 5', 6 in the insulative layer/the insulating member, each via extending through the insulative material to an associated heat spreading element;

a plurality of light emitting elements/LED chips 2, each light emitting element/LED chip disposed in one of vias/through holes, each light emitting element/LED chip is electrically and thermally connected to the heat spreading element associated with via/the through hole (Figs. 10, 16 and 18, col. 23, lines 37-50, col. 24, lines 55-67).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims **2, 25, 31 and 32** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugimoto et al. (USP 6,874,910 hereinafter as "Sugimoto") in view of Matsui et al. (US Pub. No. 2003/0052594 A1 dated 03/20/2003 filed 09/17/2002 hereinafter as "Matsui").

Sugimoto discloses all the claimed limitations as above except for the substrate is flexible. Matsui teaches that a flexible substrate is used in a lighting apparatus for the flexibility. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to use a flexible substrate in a lighting apparatus for the flexibility as taught by Matsui.

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Claims **12-15 and 17** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugimoto et al. (USP 6,874,910 hereinafter as “Sugimoto”).

Sugimoto discloses the claimed limitations except for the thermally conductive, material is an adhesive; wherein the thermally conductive, adhesive material is a polymer adhesive loaded with boron nitride; wherein the thermally conductive, material is non-adhesive; wherein the thermally conductive, non-adhesive material is a polymer loaded with silver particles; and wherein the thermally conductive member comprises a material selected from the group comprising metals and polymers. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to select either one of the thermally conductive materials as above, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Claims **35-37 and 39** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wada Kazunobu (FR 2662896 dated 12/06/1991) in view of Whitehead (USP 5,661,839).

Regarding Claims **35-37**, Wada Kazunobu discloses in Fig. 5 and the corresponding texts as set forth on page 6, line 23-page 7, line 26, a flexible circuit comprising:

a flexible layer of electrically insulative material 41;

a flexible layer of electrically conductive material 33, 48, 49 disposed on a first surface of the insulative material, the conductive material patterned to form a plurality of adjacent heat

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spreading elements, each heat spreading element having a first electrical connection pad and a second electrical connection pad;

a plurality of mounting vias extending through the insulative material wherein each mounting via exposes the first electrical connection pad of an associate heat spreading element.

Wada Kazunobu discloses the claimed limitations except for the insulating material comprising an at least partially reflective multilayer optical film, wherein the multilayer optical film is shaped into a non-planar structure. Whitehead teaches that a highly reflective multilayer optical film is used to obtain efficient, uniform emission of diffuse light as set forth in col. 1, lines 6-7. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to form the insulating material comprising an at least partially reflective multilayer optical film in order to obtain efficient, uniform emission of diffuse light. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to form the multilayer optical film being shaped into a non-planar structure, since such a modification would have involved a mere change in the shape of the multilayer optical film. A change in shape is generally recognized as being within the level of ordinary skill in the art.

Conclusion

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andy Huynh, (571) 272-1781. The examiner can normally be reached on Monday-Friday from 6:30 AM to 3:00 PM. The Fax number for the organization where this application or proceeding is assigned is (571) 273-8300.

Any inquiry of a general nature or relating to the -status of this application or proceeding should be directed to the receptionist whose phone number is (703) 308-0956.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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Andy Huynh
Patent Examiner